

Southern Pea

Penelope Perkins-Veazie¹ and Blair Buckley²

¹South Central Agricultural Laboratory, USDA, ARS, Lane, OK

²Louisiana State University Research Station, Calhoun, LA

Scientific Name and Introduction: Southern pea, or cowpea, [*Vigna unguiculata* (L.) Walp.] is a native of Africa and is adapted to hot dry climates. The southern pea is not actually a pea, and thus differs considerably from the green or English pea (*Pisum sativum*) (Peirce, 1987). Prized in the southern U.S., southern peas are rich in folic acid, fiber, and calcium. Peas are distinguished by pod color, pea color and pattern, and hilum color. Five groups of cultivars are recognized on the basis of seed and pod coloration, and seed packing in pod. They include Blackeye (California Blackeye No. 5), Cream ('Elite'), Purple Hull ('Pinkeye Purple Hull'), Crowder ('Mississippi Silver'), and miscellaneous other colored, non-crowder peas ('Dixielee'). 'Bettersnap' was developed specifically for edible pods (Fery and Dukes, 1995).

Quality Characteristics and Criteria: Some cultivars have edible pods (similar to green beans) and should be harvested when the pods are 10 to 16 cm (4 to 6 in) long, flexible, and dark green. The shelled peas should be a mature size, smooth skinned, and exhibit characteristic color.

Horticultural Maturity Indices: Fresh market southern peas are harvested when the pods are at the mature-green stage (peas are fully developed and the majority of the pods have undergone a color change). It is acceptable to have some pods that have not undergone a complete color change (green with some purpling in the case of purple hulls) provided the peas are mature size. Shelled peas preferably should be light green in color. Pea color is affected both by maturity and cultivar. Tan or white pea color is perceived to be too mature (except for cream types). Blackeye cultivars are the most difficult to determine when to harvest for fresh use because the color of the black hilum does not fully develop until at peak maturity. The color will be purple to chocolate-brown if harvested early. If southern peas are to be harvested for edible pod use, they must be selected when quite young and tender, i.e., no more than 1/2 of the expected diameter of mature green pods, unless using a cultivar specifically developed for edible pod use.

Grades, Sizes and Packaging: USDA grades of southern peas are U.S. No. 1 (95% of pods must be at least 12.5 cm (5 in) long, and U.S. Commercial (no minimum length requirement). Shelled peas are marketed in 4.5 to 5.4 kg (10 to 12 lb) plastic bags (considered the equivalent amount of a shelled bushel) or in 0.45 kg (1 lb) bags. Some large operations package peas in vacuum-packed 0.45 and 4.5 kg (1 and 10 lb) bags. No grades exist for southern peas used as snap beans. Fresh southern peas may also be sold in the hull by the bushel. A USDA bushel is 11.4 kg (25 lbs); however, at the local market level the bushel weight varies widely from region to region or from 7.3 to 13.6 kg (16 to 30 lbs). Pods for shelling are packed primarily in meshed bags (cabbage sacks) or wooden bushel baskets (increasingly less common).

Pre-cooling Conditions: In both shelled and unshelled states, peas are very prone to decay if held at room temperature. Unshelled peas are best cooled using a forced-air system. Contact with water greatly accelerates their deterioration. Shelled peas should be blown free of foreign material and then hydro-cooled in 100 ppm chlorine to remove heat quickly, preserve green color, and slow microbial growth. Peas to be trucked for processing are shelled into field bins where temperatures may reach 38 °C (100 °F) (Hardenburg et al., 1986). Peas start to yellow and decay after a few h at 25 °C (77 °F). Flavor deterioration and off-flavor in shelled peas may be a problem if they are held for as much as 7 h at 30 °C (86 °F) before processing.

Optimum Storage Conditions: Southern peas in the pod can be held for 6 to 8 days at 4 to 5 °C (39 to 41 °F) with 95% RH. Without refrigeration, they remain edible only about 2 days and show extensive decay in 4 to 6 days. Shelled peas should be held for no more than 24 to 48 h at 4 to 5 °C (39 to 41 °F) (Jenkins, 1954).

Controlled Atmosphere (CA) Considerations: Unknown.

Retail Outlet Display Conditions: Keep under high RH, refrigerate to slow decay and color loss.

Chilling Sensitivity: Unknown, probably sensitive when held at 5 °C (41 °F) or below.

Ethylene Production and Sensitivity: Unknown, probably sensitive to ethylene with effects characterized by yellowing of pods.

Respiration Rates:

Temperature	Whole pods	Shelled peas
	(mg CO ₂ kg ⁻¹ h ⁻¹)	
2 °C	13 to 36	26 to 33
5 °C	16 to 33	-
20 °C	145 to 151	90 to 161

To get mL kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day. Data are from P. Perkins-Veazie (unpublished). Data are from pods 15 to 23 cm long, of cultivars Excel, BetterSnap, Early Scarlet, Pinkeye Purple Hull BVR. Higher respiration values are for less mature (more green) peas and pods.

Physiological Disorders: Brown spots, cracking and seed-coat splitting are problems with pods and peas.

Postharvest Pathology: Very little research has been done on postharvest pathogens of southern pea. *Botrytis cinerea* (Gray Mold) can quickly develop on pods and shelled peas (Roland E. Roberts, Texas A&M, personal communication).

Quarantine Issues: None known.

Suitability as Fresh-cut Product: Snap pea or yard-long cowpea cultivars, ex., Bettersnap, can be used as a fresh-cut product. These types must be harvested at the immature pod stage.

Special Considerations: Failure to pre-cool shelled peas prior to packaging results in condensation in the bags and rapid souring and spoiling of the peas. Insect damage can create major postharvest grading problems due to feeding damage and misshaped peas caused by stinkbugs, and punctures and larvae inside of peas as a result of cowpea cucurlio.

References:

- Fery, R.L. and P.D. Dukes. 1995. 'Bettersnap' southernpea. HortScience 30:1318-1319.
Hardenburg, R.E., A.E. Watada, and C.Y. Wang. 1986. The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks. USDA Agric. Hdbk No. 66, Washington, D.C.
Jenkins, W.F. 1954. Postharvest changes in refrigerated and non-refrigerated southern peas. Proc. Amer. Soc. Hort. Sci. 64:327-330.

Peirce, L.C. 1987. Legumes-southern pea. In: Vegetables: characteristics, production, and marketing. J. Wiley and Sons, NY. pp. 345-347.